

Claims:

1. A process for preparing tertiary butanol by reacting an isobutene-containing C<sub>4</sub>-hydrocarbon stream with water over a solid acidic catalyst,  
5 characterized in that  
the isobutene-containing C<sub>4</sub>-hydrocarbon stream and water are fed into a reactive distillation column below the reaction zone.
2. The process as claimed in claim 1,  
10 characterized in that  
an isobutene-containing C<sub>4</sub>-hydrocarbon stream, water and tert-butanol are fed into the reactive distillation column.
3. The process as claimed in claim 1 or 2,  
15 characterized in that  
an isobutene-containing C<sub>4</sub>-hydrocarbon stream is firstly reacted with water over an acidic solid catalyst to a conversion of isobutene into tert-butanol of from 65 to 97% and the mixture obtained in this way is fed into the reactive distillation column.
- 20 4. The process as claimed in any of claims 1 to 3,  
characterized in that  
a C<sub>4</sub>-hydrocarbon stream having an isobutene content of less than 700 ppm by mass is taken off at the top of the reactive distillation column.
- 25 5. The process as claimed in any of claims 1 to 4,  
characterized in that  
the mixture obtained at the top of the reactive distillation column is separated into an aqueous phase and an organic phase and the aqueous phase is returned to the reactive distillation column.
- 30 6. The process as claimed in any of claims 1 to 5,

characterized in that

the reactive distillation column is configured as a distillation column provided with one or more external reactors in which the catalyst is present and through which a secondary stream passes.

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7. The process as claimed in any of claims 1 to 5,  
characterized in that

the reactive distillation column is configured as a distillation column provided with one or more catalyst-containing reactors integrated into the distillation section.

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8. The process as claimed in any of claims 1 to 7,  
characterized in that

a homogeneous mixture saturated with water is fed into the reactive distillation column.

- 15 9. The process as claimed in any of claims 1 to 7,  
characterized in that

a heterogeneous mixture is fed into the reactive distillation column.

10. The process as claimed in any of claims 1 to 9,

20 characterized in that

the isobutene-containing C<sub>4</sub>-hydrocarbon stream and water are fed in at different points on the reactive distillation column.